



Light-Duty Vehicle Operator Survey: Summary of October 1996 Data Collection Period

Introduction

The primary objective of the light-duty vehicle operator survey is to collect performance and driveability data on alternative fuel vehicles (AFVs) and comparable gasoline vehicles. The data are collected through telephone surveys, which are conducted by Dwigths Energydata for the U.S. Department of Energy's (DOE) National Renewable Energy Laboratory (NREL). Four survey rounds are planned this year—each will be conducted during a different season to capture any seasonal differences. This report summarizes the results from the fourth survey, which was conducted during the fall of 1996. Dwigths Energydata supplied the data to NREL, where the information was analyzed.

Data were collected on compressed natural gas (CNG) vehicles, flexible-fuel ethanol (E85) vehicles, flexible-fuel methanol (M85) vehicles, and similar gasoline vehicles from the original equipment manufacturers (OEM). Data were also collected from gasoline vehicles that have been converted to operate on CNG (most are bi-fuel after conversion). The survey was conducted with federal government fleet managers and drivers who operate AFVs or gasoline vehicles as a regular part of their work assignments in various cities and states across the country. Most of the AFVs and gasoline vehicles are leased from the General Services Administration (GSA), except for the vehicles converted to operate on CNG. The converted vehicles evaluated in this survey were owned by the federal agency that operates the vehicles.

Fleet managers surveyed were selected randomly from a fleet contact list developed from data provided by GSA, sites involved in the DOE/NREL vehicle conversion project, and from a number of military installations. All the fleet managers in the contact list had AFVs in their fleet. Drivers surveyed were randomly selected from the contact list developed by contacting fleet managers from the GSA and CNG conversion fleet manager lists. The drivers contacted are not necessarily associated with the fleet managers who participated in the survey during this period. Although fleet managers and drivers were contacted randomly, we did focus on conducting surveys with operators located in areas of the country where alternative fuels were available. A summary of the fleet and driver survey results is provided in the sections that follow.

NREL is a national laboratory of the U.S. Department of Energy (DOE). This survey was conducted for DOE by NREL's Center for Transportation Technologies and Systems.

Fleet Manager Survey Results

The fleet manager survey was designed to obtain perspectives on AFV performance and maintenance in comparison to similar gasoline-fueled vehicles. During this survey period, fleet managers in 23 different states were contacted. Each fleet manager was asked to identify the primary alternative fuel used by AFVs in his fleet. Several fleet managers operate more than one model of AFV, or operate vehicles on more than one alternative fuel. Fleet managers contacted were categorized as follows:

Primary alternative fuel	Number of fleet managers	Fleet managers who operate more than one vehicle model on primary alternative fuel	Fleet managers who operate vehicles on other alternative fuels
CNG-OEM ¹	22	3	1 (M85)
CNG-QVM ²	1	1	-
CNG-CON ³	6	2	1 (M85)
E85	23	4	2 (M85)
M85	23	2	1 (E85)
Total	75	12	5

¹ Original equipment manufacturer

² Qualified vehicle modifier

³ Aftermarket conversion (See Appendix A for definitions of OEM, QVM, and conversion)

The number of vehicles in the fleets represented by these fleet managers is summarized in the following table:

Fleet size (number of vehicles)	Fleets (total LDVs)		Total AFVs in all fleets	
	No.	%	No.	%
10 or less	38	51	58	77
11 to 50	20	26	14	19
51 to 100	9	12	3	4
101 to 200	3	4	0	0
more than 200	5	7	0	0

When asked if drivers of their fleet vehicles specifically requested AFVs, fleet managers provided the following information:

Response	Fleet managers responding this way	
	No.	%
Don't want AFV	18	24
Want AFV	20	27
Neutral	36	48
Haven't noticed	1	1

The most common reasons drivers of their fleet vehicles didn't want or were neutral about the AFVs included: (1) lack of vehicle range (primarily dedicated CNG vehicles), (2) lack of vehicle choice, and (3) lack of convenient refueling or no alternative fuel available (most common for alcohol-fueled vehicles).

Fleet managers were asked if drivers of their fleet vehicles tend to report more vehicle performance complaints about AFVs or gasoline vehicles. Fifty-five of the 75 fleet managers (73%) indicated no difference in the number of performance complaints between AFVs and gasoline vehicles. Seventeen fleet managers (23%) reported that the AFVs received more complaints, and the remaining three fleet managers reported gasoline-fueled vehicles received more complaints.

When asked about the specific performance complaints they had received from their AFV drivers over the last month, fleet managers reported the following:

Complaints about AFVs	Fleet managers who received complaints	
	No.	%
Hard to start	1	1.3

Fleet managers were also asked about driver reports of stalling, poor idle, hesitation, lack of power engine ping and the check engine light coming on, but none reported receiving these complaints. Almost no performance complaints were received this period from drivers operating AFVs in these fleets.

The fleet managers were next questioned about their AFV fueling practices. Thirty-one of the 75 fleet managers (41%) reported that there was *not* an alternative fuel station reasonably close to them. Eight of the 75 fleet managers (11%) received complaints from their drivers about alternative fuel stations being hard to find (i.e., there are not enough stations). When asked if the AFVs in their fleet were usually fueled with an alternative fuel or gasoline, the following information was obtained:

Fuel usually used in AFVs	All fleet managers responding this way		Responses of fleet managers whose primary AFV type is:									
			CNG						E85		M85	
			OEM		QVM		CON					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Alternative fuel	52	69	22	100	1	100	5	83	15	65	9	39
Gasoline	23	31	0	0	0	0	1	17	8	35	14	61
Total	75	100	22	100	1	100	6	100	23	100	23	100

Sixty-nine percent of fleet managers reported their AFVs are being refueled most of the time with an alternative fuel. Flexible-fuel vehicles designed to use M85 are the least likely to be regularly fueled with an alternative fuel.

Finally, fleet managers were asked questions related to vehicle maintenance. Most of the fleet managers (91%) indicated that different or additional scheduled maintenance was not required on the AFVs. The only feedback related to regular or scheduled maintenance was that M85 and E85 vehicles require a special oil, which is hard to find. The fleet managers were also asked about the frequency and types of unscheduled maintenance. Again, the majority (95%) experienced no difference in the types or frequency of unscheduled maintenance for AFVs.

The last maintenance question addressed AFV versus gasoline vehicle downtime. Ninety-five percent of the respondents indicated that the vehicle downtime is about the same for AFV and gasoline vehicles in their fleet (all reported an average of less than one day per month). Those who indicated that downtime differed reported that AFVs had more downtime.

Driver Survey Results

The driver surveys concentrate on the operator's subjective assessment of the performance of different AFVs compared to similar gasoline vehicles. The drivers were asked several questions to determine how much driving they do at work and whether they could identify the vehicle they operate at work as an AFV. The goal was to survey 50 drivers of each of the following types of AFVs fueled with each of the following fuels: CNG-OEM/QVM, CNG conversions, E85 flexible-fuel, and M85 flexible-fuel, as well as 50 drivers of similar gasoline vehicles. During this survey period, 89 of the drivers surveyed had been contacted in a previous survey period. Of these drivers, 14 were driving different vehicles when they previously participated in the survey.

Vehicle and Driver Information

The following table summarizes the number of drivers surveyed by vehicle type:

Vehicle type	Number of drivers surveyed	% of driver surveys
CNG-OEM	45	18
CNG-QVM	5	2
CNG-CON	50	20
E85	50	20
Gasoline	50	20
M85	50	20
Total	250	100

During this survey period, CNG-fueled vehicles fell into two primary categories, OEMs and CONs. The OEM vehicles were further categorized as OEM and QVM (see Appendix A for definitions). The results of the CNG vehicle driver surveys are presented as OEM, QVM, and CON throughout this section. The vehicles included in the survey, including their locations, are summarized in Appendix B.

Eighty-seven percent of the drivers indicated that they are assigned the vehicles they drive, and have no choice of vehicle. The amount of time the drivers had driven their vehicles, as well as their driving characteristics are indicated below:

Time driven	Drivers		Miles driven in typical week	Drivers		Highway driving (%)	Drivers	
	No.	%		No.	%		No.	%
6 months or less	53	21	less than 25	33	13	less than 10	110	44
6 months to 1 year	28	11	26 to 50	45	18	11 to 25	19	8
1 to 2 years	93	37	51 to 100	33	13	26 to 50	27	11
2 to 3 years	59	24	101 to 200	34	14	51 to 75	26	10
more than 3 years	17	7	more than 200	105	42	76 to 100	68	27

Refueling Information

During this survey period, eighty-nine percent of drivers indicated that they refueled their own vehicles. AFV drivers were asked what percentage of the time they used an alternative fuel in the vehicles, and their answers are summarized in the following table:

Percentage of time alternative fuel used	Drivers of vehicles fueled by:											
	Total		CNG						Ethanol		Methanol	
			OEM		QVM		CON					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0 (gasoline only)	6	3	-	-	0	0	2	4	2	4	2	4
5 to 25	16	8	-	-	0	0	0	0	3	6	13	26
26 to 50	9	4.5	-	-	0	0	1	2	4	8	4	8
51 to 75	10	5	-	-	0	0	2	4	1	2	7	14
76 to 99	11	5.5	-	-	0	0	1	2	3	6	7	14
100	148	74	45	100	1	100	44	88	37	74	17	34

Seventy-four percent of these drivers indicated they operate their vehicle 100% of the time on alternative fuel. Drivers of M85 flexible-fuel vehicles were most likely to use gasoline (instead of M85) in their vehicles (38% of drivers used M85 less than 50% of the time). When asked whether an alternative fuel station was within a reasonable distance from where most of their driving was done, about 72% of the drivers responded “yes.” Most of the drivers (94%) indicated a fueling station had to be less than a half mile away to be convenient. The following table summarizes responses from drivers of AFVs regarding some attributes of alternative fuel refueling stations:

Fueling Station Attribute	Acceptable		Marginal		Not Acceptable		Total	
	No.	(%)	No.	(%)	No.	(%)	No.	(%)
Accessibility	161	83	24	12	10	5	195	100
Hours of operation	186	95	9	5	0	0	195	100
Ease of filling	176	90	14	7	5	3	195	100

The majority (94%) of drivers had no personal concerns about refueling their AFV. Those not providing a response to this question generally operated their vehicle only on gasoline or did not refuel their vehicle themselves.

Vehicle Performance Information

Drivers were asked to provide an overall evaluation of how their vehicles perform. The results are tabulated below:

Vehicle performance rating	Drivers of vehicles fueled by:													
	All		CNG						E85		Gasoline		M85	
			OEM		QVM		CON							
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Excellent	67	27	9	20	2	40	8	16	12	25	24	48	12	25
Very good	91	37	17	38	1	20	8	16	28	57	17	34	20	42
Average	61	24	11	24	1	20	22	44	8	16	6	12	13	27
Fair	14	6	3	7	0	0	7	14	0	0	2	4	2	4
Poor	14	6	5	11	1	20	5	10	1	2	1	2	1	2

Eighty-eight percent of drivers rated their vehicle performance as average or better. The remaining 12% of drivers rated vehicle performance as fair or poor. Over 70% of the vehicles rated fair or poor were fueled by CNG. When drivers were asked how an AFV compares to similar gasoline vehicles, or vice versa, the following information was obtained:

Vehicle comparison	AFV driver (AFV compared to gasoline)		Gasoline vehicle driver (gasoline compared to AFV)	
	No.	%	No.	%
Better	23	12	18	56
About the same	126	64	12	38
Not as well	47	24	2	6

The majority (76%) of AFV drivers said their vehicles were the same or better than gasoline vehicles. Of AFV drivers rating their vehicle performance as worse than a similar gasoline-fueled vehicle, 74% (35 out of 47) operated CNG-OEM or CNG conversion vehicles. When asked why they felt the AFVs performed worse, limited vehicle range and lack of power were the most common responses. It is important to note that a fair number of the gasoline vehicle drivers surveyed (36% or 18 of 50) did not provide an answer to this question. In general, the non-responding drivers of AFVs had only driven their vehicle on gasoline and the non-responding gasoline drivers had never driven an AFV, so these drivers felt they had no basis for comparison.

Next, drivers were asked whether they had experienced any performance-related problems with their vehicle over the last month. The “yes” responses are summarized below:

Performance problem	Number of reports from drivers of vehicles fueled by:					
	CNG			E85	Gasoline	M85
	OEM	QVM	CON			
Stalled in traffic	-	-	-	-	-	1
Poor idle	-	-	1	-	-	-
Hesitation	-	-	2	1	-	-
Lack of power	-	-	-	-	1	1
Total	0	0	3	1	1	2

Overall, few performance problems were reported. Drivers were also asked about their vehicle being hard to start, stalling, experiencing engine ping, or the check engine light coming on--none of these problems were reported.

Next, drivers were asked to rate the acceleration of their vehicles. The following table summarizes the responses:

Vehicle acceleration rating	Drivers of vehicles fueled by:													
	All		CNG						E85		Gasoline		M85	
			OEM		QVM		CON							
	No.	%	No .	%	No .	%	No .	%	No .	%	No.	%	No.	%
Excellent	56	23	9	20	1	20	7	14	18	37	9	18	12	25
Very good	59	24	12	27	1	20	3	6	18	37	19	39	6	13
Average	100	41	19	42	3	60	20	40	11	22	20	41	27	56
Fair	15	6	4	9	0	0	8	16	1	2	1	2	1	2
Poor	16	6	1	2	0	0	12	24	1	2	0	0	2	4

Most drivers (88%) rated their vehicle acceleration as average or better. The majority of vehicles (75%) receiving poor acceleration ratings were dedicated CNG conversion vehicles.

The final performance question asked of drivers was how satisfied they were with the vehicle range on a tank of fuel. The results are tabulated below:

Vehicle range rating	Drivers of vehicles fueled by:													
	All		CNG						E85		Gasoline		M85	
			OEM		QVM		CON							
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Acceptable	165	66	11	25	1	20	26	52	40	80	47	94	40	80
Marginal	58	23	19	42	3	60	15	30	9	18	3	6	9	18
Not acceptable	27	11	15	33	1	20	9	18	1	2	0	0	1	2

In general, drivers of CNG-fueled vehicles were the least satisfied with driving range; 73% of vehicles rated with marginal or not acceptable range were CNG-fueled. Most drivers of E85-fueled, M85-fueled, and gasoline-fueled vehicles were satisfied with their driving range.

Drivers were asked what their overall satisfaction level was with the vehicle they drive at work. They were asked to think about performance, convenience, and any other factors that influenced them while driving. Their answers are summarized below:

Overall vehicle satisfaction level	Drivers of vehicles fueled by:													
	All		CNG						E85		Gasoline		M85	
			OEM		QVM		CON							
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Very satisfied	112	47	14	31	1	20	17	34	29	59	32	75	19	40
Leaning toward satisfied	65	27	14	31	3	60	10	20	15	31	9	21	14	29
Neutral	39	16	9	20	1	20	13	26	4	8	1	2	11	23
Leaning toward dissatisfied	14	6	5	11	0	0	5	10	1	2	1	2	2	4
Dissatisfied	10	4	3	7	0	0	5	10	0	0	0	0	2	4

The majority (~74%) of drivers were satisfied or very satisfied overall with their vehicle. All the dissatisfied drivers operated CNG-fueled or M85-fueled vehicles. The most common negative responses were associated with poor mileage or range of the CNG-OEM vehicles and not enough refueling stations for all AFVs.

The AFV drivers were asked if they would recommend a vehicle that operates on an alternative fuel to someone else. The results are summarized below:

Recommend AFV	Drivers of vehicles fueled by:											
	All AFVs		CNG						E85		M85	
			OEM		QVM		CON					
	No.	%	No	%	No.	%	No.	%	No.	%	No.	%
Yes	129	66	25	56	4	80	27	55	39	80	34	71
No	67	34	20	44	1	20	22	45	10	20	14	29

Nearly 2 out of 3 AFV drivers would recommend an AFV to other drivers. Drivers of AFVs who would not recommend them were asked to identify the single most important reason. The most common answers from drivers of CNG-fueled vehicles was lack of vehicle range, followed by lack of fueling stations and safety concerns. For drivers of alcohol-fueled vehicles (E85 & M85), the most common reason to not recommend AFVs was lack of fuel availability.

Summary

The fourth quarter survey round was completed with responses from 75 fleet managers and 250 drivers of federal fleet vehicles. The major survey findings were:

From fleet managers:

- Seventy-seven percent of fleet managers interviewed operate 10 or fewer AFVs in their fleets.
- Lack of range and convenient refueling facilities are the most common reasons fleet managers cite for their vehicle drivers not wanting AFVs.
- Seventy-three percent of fleet managers indicated they received the same number of performance complaints about AFVs and gasoline vehicles. No specific performance complaint occurs more frequently.
- Sixty-nine percent of fleet managers indicate their AFVs refuel with alternative fuel most of the time.
- Most fleet managers (>90%) reported no difference in types or frequency of unscheduled maintenance, with vehicle downtime averaging less than one day each month.

From drivers:

- Drivers generally have more than six months experience operating their AFV. They typically drive more than 50 miles per week, with less than 10% of their driving on the highway.

- More than 70% of AFV drivers indicated their vehicles operated 100% of the time on alternative fuel. Drivers of M85 flexible-fuel vehicles were the least likely to refuel regularly with the alternative fuel.
- More than 70% of AFV drivers indicated an alternative fuel station was within a reasonable distance. Ninety-four percent of drivers indicated ½ mile as a reasonable distance.
- Eighty-eight percent of AFV and gasoline drivers rated overall vehicle performance average or better.
- Very few performance complaints were reported during this survey period.
- Drivers of CNG-fueled vehicles were the least satisfied with driving range. Seventy-three percent of marginal and not acceptable vehicle range ratings were received from drivers of CNG-fueled AFVs.
- More than 74% of drivers were satisfied or very satisfied overall with their vehicle.
- Sixty-six percent of AFV drivers would recommend AFVs to others. The most common reasons for *not* recommending AFVs were the lack of refueling stations, and lack of range for CNG-fueled vehicles.

Appendix A. AFV Options Description

There are three principal types of AFVs available: original equipment manufacturer (OEM) vehicles, qualified vehicle modifier (QVM) vehicles, and aftermarket conversions (CON). The OEM vehicles are designed and built by the OEMs (such as Chrysler, Ford, or General Motors). All of the alcohol-fueled vehicles and some CNG vehicles fall into this category. OEM AFVs are designed with the engine, suspension, and chassis upgrades to result in optimum performance and durability. These vehicles have single comprehensive warranties that cover all components, including those that are specific to alternative fuels.

The QVM vehicles are similar to the OEMs except the manufacturer has joined with a “qualified” conversion company to complete the final assembly that enables the vehicle to operate on an alternative fuel. QVMs generally have the same upgrades to the engine and chassis as the OEMs, meet the same safety and emissions standards, and offer a single comprehensive warranty. The QVMs, which are currently available in CNG and LPG models, may be dedicated or bi-fuel, depending on owner preference.

Aftermarket conversions are conversions of gasoline vehicles by an independent company after the vehicle has been purchased. The converted vehicles do not have the engine and chassis upgrades offered in the OEM and QVM vehicles. The conversion company generally provides a separate warranty from the OEM and the OEM warranty will not cover problems or damages resulting from installation or operation of the vehicle on the alternative fuel. Available aftermarket conversions enable operation on CNG or LPG, and may be bi-fuel or dedicated, depending on owner preference. CNG-fueled vehicles are identified as OEM, QVM, or CON where appropriate throughout this summary.

Appendix B. Surveyed Drivers' Vehicles &
Location

(October 1996 Period)

Vehicle/Fuel	MODEL	Year	CITY	ST
CNG-CON	Caravan	1993	Camp Pendelton	CA
CNG-CON	Caravan	1994	Camp Pendelton	CA
CNG-CON	Caravan	1994	Camp Pendelton	CA
CNG-CON	Chevy Pickup	1996	Camp Pendelton	CA
CNG-CON	Chevy Van	1985	Camp Pendelton	CA
CNG-CON	Ford F250	1993	Camp Pendelton	CA
CNG-CON	Ford F250	1993	Camp Pendelton	CA
CNG-CON	Ford Pickup	1994	Camp Pendelton	CA
CNG-CON	Ram Van	1993	Camp Pendelton	CA
CNG-CON	Ram Van	1993	Camp Pendelton	CA
CNG-CON	Ram Van	1995	Camp Pendelton	CA
CNG-CON	Ford Pickup	1994	Santa Ana	CA
CNG-CON	Ford Pickup	1994	Santa Ana	CA
CNG-CON	Ford Pickup	1995	Santa Ana	CA
CNG-CON	Ford Ranger	1991	Santa Ana	CA
CNG-CON	Ford Ranger	1991	Santa Ana	CA
CNG-CON	Ford Ranger	1994	Santa Ana	CA
CNG-CON	Ford Ranger	1994	Santa Ana	CA
CNG-CON	Chevy Pickup	1994	Denver	CO
CNG-CON	GMC Pickup	1993	Washington	DC
CNG-CON	MCI Van	1989	Washington	DC
CNG-CON	Chevy Pickup	1988	Dobbins AFB	GA
CNG-CON	Chevy Pickup	1988	Dobbins AFB	GA
CNG-CON	Chevy Station Wagon	1994	Dobbins AFB	GA
CNG-CON	Crown Victoria	1993	Dobbins AFB	GA
CNG-CON	Ford Pickup	1990	Dobbins AFB	GA
CNG-CON	Caravan	1995	Glynco	GA
CNG-CON	Chevy Pickup	1991	RASF	GA
CNG-CON	Chevy Pickup	1993	RASF	GA
CNG-CON	Chevy Pickup	1995	RASF	GA
CNG-CON	Ford F350	1993	RASF	GA
CNG-CON	Ford Pickup	1993	Robbins AFB	GA
CNG-CON	Ford Ranger	1988	Robbins AFB	GA
CNG-CON	Chrysler Van	1991	Robins AFB	GA
CNG-CON	Blazer	1992	Bethesda	MD
CNG-CON	Chevy Pickup	1991	Bethesda	MD
CNG-CON	Ford Pickup	1991	Bethesda	MD
CNG-CON	Jeep Cherokee	1992	Bethesda	MD
CNG-CON	Bronco	1995	Nello AFB	NV
CNG-CON	Chevy C1500	1994	Nello AFB	NV
CNG-CON	GMC Pickup	1994		NV
CNG-CON	Chevy Pickup	1987	F.E. Warren AFB	WY
CNG-CON	Chevy Pickup	1988	F.E. Warren AFB	WY
CNG-CON	Ford F150	1995	F.E. Warren AFB	WY
CNG-CON	Ford Ranger	1994	F.E. Warren AFB	WY
CNG-CON	GMC Pickup	1994	F.E. Warren AFB	WY
CNG-CON	GMC Pickup	1994	F.E. Warren AFB	WY
CNG-CON	Dodge Pickup	1993		WY
CNG-OEM	Caravan	1991	Camp Pendelton	CA
CNG-OEM	Caravan	1994	Camp Pendelton	CA
CNG-OEM	Caravan	1995	Camp Pendelton	CA
CNG-OEM	Ram Van	1992	Camp Pendelton	CA
CNG-OEM	Caravan	1992	Putman	CA
CNG-OEM	Caravan	1995	Putman	CA
CNG-OEM	Caravan	1996	Putman	CA
CNG-OEM	Chevy Pickup	1994	Putman	CA
CNG-OEM	Ram Van	1992	Putman	CA
CNG-OEM	Ram Van	1992	Putman	CA
CNG-OEM	Ram Van	1993	Putman	CA
CNG-OEM	Ram Van	1994	Putman	CA
CNG-OEM	Ram Van	1994	Putman	CA
CNG-OEM	Ram Van	1994	Putman	CA
CNG-OEM	Ram Van	1994	Putman	CA
CNG-OEM	Ram Van	1994	Putman	CA
CNG-OEM	Ram Van	1994	Putman	CA
CNG-OEM	Ram Van	1995	Putman	CA
CNG-OEM	Ram Van	1996	Putman	CA

Vehicle/Fuel	MODEL	Year	CITY	ST
CNG-OEM	Ram Van	1996	Putman	CA
CNG-OEM	Ram Van	1996	Putman	CA
CNG-OEM	Ram Van	1993	Putnam	CA
CNG-OEM	Caravan	1995	Golden	CO
CNG-OEM	Caravan	1995	Golden	CO
CNG-OEM	Caravan	1996	Golden	CO
CNG-OEM	Caravan	1994	Washington	DC
CNG-OEM	Caravan	1995	Washington	DC
CNG-OEM	Caravan	1994	Kennedy Space Center	FL
CNG-OEM	Dodge Dakota	1992	RASF	GA
CNG-OEM	Caravan	1994	Argonne	IL
CNG-OEM	Caravan	1995	Argonne	IL
CNG-OEM	Ram Van	1994	Argonne	IL
CNG-OEM	Ram Van	1996	Bethesda	MD
CNG-OEM	Caravan	1995	Hyattsville	MD
CNG-OEM	Caravan	1995	Hyattsville	MD
CNG-OEM	Caravan	1995	Charlotte	NC
CNG-OEM	Caravan	1996	Charlotte	NC
CNG-OEM	Ram Van	1994	Kirtland AFB	NM
CNG-OEM	Caravan	1994	Los Alamos	NM
CNG-OEM	Ram Van	1994	Ft. Jackson	SC
CNG-OEM	Ram Van	1994	Ft. Jackson	SC
CNG-OEM	Ram Van	1995	Ft. Jackson	SC
CNG-OEM	Ram Van	1994	Amarillo	TX
CNG-OEM	Caravan	1994	Austin	TX
CNG-OEM	Caravan	1994	Austin	TX
CNG-QVM	Ford F150	1996	Putman	CA
CNG-QVM	Ford F150	1995	Argonne	IL
CNG-QVM	Ford F150	1996	Argonne	IL
CNG-QVM	Ford F150	1996	Argonne	IL
CNG-QVM	Ford F150	1996	Argonne	IL
E85	Lumina	1993	Washington	DC
E85	Lumina	1994	Argonne	IL
E85	Taurus	1994	Argonne	IL
E85	Taurus	1994	Argonne	IL
E85	Taurus	1995	Argonne	IL
E85	Taurus	1995	Argonne	IL
E85	Taurus	1995	Argonne	IL
E85	Taurus	1996	Argonne	IL
E85	Taurus	1995	Chicago	IL
E85	Taurus	1995	Chicago	IL
E85	Taurus	1995	Chicago	IL
E85	Taurus	1995	Chicago	IL
E85	Taurus	1996	Chicago	IL
E85	Taurus	1996	Chicago	IL
E85	Taurus	1996	Chicago	IL
E85	Taurus	1996	Chicago	IL
E85	Lumina	1993	Des Plaines	IL
E85	Lumina	1993	Des Plaines	IL
E85	Taurus	1995	Des Plaines	IL
E85	Taurus	1995	Des Plaines	IL
E85	Taurus	1995	Des Plaines	IL
E85	Taurus	1996	N. Riverside	IL
E85	Taurus	1996	N. Riverside Chicago	IL
E85	Taurus	1996	N. Riverside Chicago	IL
E85	Taurus	1996	Peoria	IL
E85	Taurus	1995	Schiller Park	IL
E85	Taurus	1995	Springfield	IL
E85	Taurus	1996	Springfield	IL
E85	Taurus	1996	Springfield	IL
E85	Taurus	1996	Springfield	IL
E85	Taurus	1996	Springfield	IL
E85	Taurus	1996	Springfield	IL
E85	Taurus	1996	Springfield	IL
E85	Taurus	1996	Springfield	IL
E85	Taurus	1996	Springfield	IL
E85	Taurus	1996	Clintontownship	MI
E85	Taurus	1996	Dearborn	MI
E85	Taurus	1994	St. Louis	MO
E85	Taurus	1995	St. Louis	MO
E85	Taurus	1995	St. Louis	MO
E85	Taurus	1995	St. Louis	MO
E85	Taurus	1995	St. Louis	MO

E85	Taurus	1995	St. Louis	MO
E85	Taurus	1995	St. Louis	MO
E85	Taurus	1995	St. Louis	MO
E85	Taurus	1995	St. Louis	MO
E85	Taurus	1996	St. Louis	MO
E85	Lumina	1995	Pierre	SD
E85	Taurus	1995	Madison	WI
E85	Taurus	1996	Madison	WI
E85	Taurus	1996	Madison	WI
GAS	Chevy Van	1996	Huntsville	AL
GAS	Ford F150	1995	Phoenix	AZ
GAS	Econoline	1994	Camp Pendelton	CA
GAS	Ford Van	1996	Putman	CA
GAS	Ford Van	1996	Putman	CA
GAS	Ford Van	1996	Putman	CA
GAS	Ford Van	1996	Putman	CA
GAS	Ram Pickup	1996	Putman	CA
GAS	Ram Van	1992	Putman	CA
GAS	Ram Van	1993	Putman	CA
GAS	Ram Van	1994	Putman	CA
GAS	Ram Van	1994	Putman	CA
GAS	Ram Van	1994	Putman	CA
GAS	Ram Van	1994	Putman	CA
GAS	Ram Van	1994	Putman	CA
GAS	Ram Van	1994	Putman	CA
GAS	Ram Van	1994	Putman	CA
GAS	Spirit	1994	Putman	CA
GAS	Spirit	1993	Aurora	CO
GAS	Taurus	1996	Boulder	CO
GAS	Taurus	1993	Colorado Springs	CO
GAS	Caravan	1993	Golden	CO
GAS	Caravan	1994	Golden	CO
GAS	Taurus	1996	Lakewood	CO
GAS	Spirit	1993	Pueblo	CO
GAS	Chevy Pickup	1995	Milford	CT
GAS	Ram Pickup	1991	Washington	DC
GAS	Ram Van	1995	Newark	DE
GAS	Chevy Pickup	1987	RASF	GA
GAS	Chevy Pickup	1994	RASF	GA
GAS	Ram Pickup	1993	Shoshone	ID
GAS	Taurus	1995	Argonne	IL
GAS	Ram Van	1991	Batavia	IL
GAS	Caravan	1991	Chicago	IL
GAS	Taurus	1996	Chicago	IL
GAS	Ford Pickup	1995	Frankford	KY
GAS	Ram Van	1994	Baltimore	MD
GAS	Ram Van	1992	Clintontownship	MI
GAS	Taurus	1995	Kansas City	MO
GAS	Taurus	1995	Kansas City	MO
GAS	Taurus	1995	St. Louis	MO
GAS	Taurus	1995	St. Louis	MO
GAS	Chevy Pickup	1993	Jackson	MS
GAS	Ford Pickup	1992	Poplar	MT
GAS	Lumina	1994	Fort Dfiance	NM
GAS	Lumina	1994	Zuni	NM
GAS	Ram Van	1994	Providence	RI
GAS	Ram Van	1995	Brookings	SD
GAS	Ram Van	1995	Denton	TX
GAS	Spirit	1994	Herndon	VA
M85	Spirit	1993	Gardena	CA
M85	Taurus	1995	Gardena	CA
M85	Spirit	1993	San Jose	CA
M85	Lumina	1993	Aurora	CO
M85	Spirit	1993	Aurora	CO
M85	Taurus	1993	Aurora	CO
M85	Taurus	1996	Aurora	CO
M85	Taurus	1996	Aurora	CO
M85	Lumina	1993	Denver	CO
M85	Lumina	1993	Denver	CO
M85	Lumina	1993	Denver	CO
M85	Spirit	1993	Denver	CO
M85	Spirit	1993	Denver	CO
M85	Spirit	1993	Denver	CO

M85	Spirit	1993	Denver	CO
M85	Spirit	1993	Denver	CO
M85	Spirit	1993	Denver	CO
M85	Spirit	1993	Denver	CO
M85	Spirit	1993	Denver	CO
M85	Spirit	1993	Denver	CO
M85	Spirit	1994	Denver	CO
M85	Taurus	1994	Denver	CO
M85	Spirit	1993	Englewood	CO
M85	Econoline	1993	Lakewood	CO
M85	Spirit	1993	Lakewood	CO
M85	Taurus	1994	Lakewood	CO
M85	Spirit	1993	Bolling AFB	DC
M85	Dodge Shadow	1995	Washington	DC
M85	Lumina	1994	Washington	DC
M85	Spirit	1991	Washington	DC
M85	Spirit	1993	Washington	DC
M85	Spirit	1993	Washington	DC
M85	Taurus	1993	Washington	DC
M85	Intrepid	1995	Argonne	IL
M85	Spirit	1993	Argonne	IL
M85	Spirit	1993	Argonne	IL
M85	Spirit	1993	Argonne	IL
M85	Spirit	1993	Argonne	IL
M85	Spirit	1993	Argonne	IL
M85	Spirit	1993	Argonne	IL
M85	Spirit	1995	Argonne	IL
M85	Spirit	1995	Argonne	IL
M85	Taurus	1995	Argonne	IL
M85	Taurus	1995	Argonne	IL
M85	Taurus	1995	Argonne	IL
M85	Spirit	1993	Chicago	IL
M85	Spirit	1993	Chicago	IL
M85	Spirit	1995	Baltimore	MD
M85	Taurus	1993	Royal Oak	MI
M85	Taurus	1995	Royal Oak	MI
M85	Taurus	1996	Madison	WI